

What is claimed is:

1. A gas/liquid separator assembly comprising:
  - (a) a vessel including an outer wall and having a gas flow inlet and a lower sump;
  - (b) a preseparation assembly including:
    - (i) a radially continuous axial shroud positioned spaced from the vessel outer wall to define a gas flow annulus therebetween;
    - and
  - (c) a mounting space for at least one removable and replaceable separator element surrounded by and spaced from the gas flow inlet by the axial shroud;
    - (i) the axial shroud extending along a distance of at least 20%, and not more than 60%, of the axial length of the mounting space for at least one removable and replaceable separator element.
2. A gas/liquid separator assembly according to claim 1 wherein:
  - (a) the axial shroud extending along a distance of at least 35%, and not more than 60%, of the axial length of the mounting space for at least one removable and replaceable separator element.
3. A gas/liquid separator assembly according to claim 2 wherein:
  - (a) the axial shroud extending along a distance of at least 35%, and not more than 50%, of the axial length of the mounting space for at least one removable and replaceable separator element.
4. A gas/liquid separator assembly according to claim 1 wherein:
  - (a) the axial shroud has an upper funnel section and a lower cylindrical section.
5. A gas/liquid separator assembly according to claim 1 including:
  - (a) an inlet skirt positioned below the gas flow inlet and extending to the vessel outer wall;

- (i) the gas flow inlet being positioned to direct inlet gas flow into the gas flow annulus above the inlet skirt;
    - (ii) the inlet skirt including at least one downcomer channel at a location radially spaced from the inlet; and,
  - (b) a radial vane positioned between the downcomer channel and the gas flow inlet to direct gases through a radial path of at least 70° before the gases can pass from the gas flow inlet through the downcomer channel; and,
  - (c) at least one removable and replaceable separator element positioned, in the mounting space for at least one removable and replaceable separator element, surrounded by and spaced from the gas flow inlet by the axial shroud.
6. A gas/liquid separator assembly according to claim 5 wherein:
- (a) the radial vane is positioned to direct gases through a radial path of at least 180° before the gases can pass from the gas flow inlet through the downcomer channel.
7. A gas/liquid separator assembly according to claim 6 wherein:
- (a) the axial shroud is cylindrical.
8. A gas/liquid separator assembly according to claim 5 wherein:
- (a) the outer wall is generally cylindrical; and,
  - (b) the gas flow inlet is a radial inlet.
9. A gas/liquid separator assembly according to claim 8 wherein:
- (a) the vessel includes a gas flow outlet extending through the outer wall and spaced from the gas flow inlet by a tube sheet arrangement; and,
  - (b) the at least one removable and replaceable separator element is configured for in-to-out flow.

10. A gas/liquid separator assembly according to claim 9 including:
  - (a) at least two serviceable separator elements each of which is positioned in the mounting space for at least one removable and replaceable separator element.
11. A gas/liquid separator assembly according to claim 10 wherein:
  - (a) the downcomer channel is spaced from the gas flow inlet, by a radial path of at least 230°.
12. A gas/liquid separator assembly according to claim 11 wherein:
  - (a) the downcomer channel has a radial extension of at least 30°.
13. A gas/liquid separator assembly according to claim 12 wherein:
  - (a) the downcomer channel has a radial extension of no more than 130°.
14. A gas/liquid separator assembly according to claim 5 wherein:
  - (a) the inlet skirt has an upper surface which slants downwardly in extension toward said outer wall.
15. A gas/liquid separator assembly according to claim 14 wherein:
  - (a) the inlet skirt slants downwardly at an angle within the range of 20° to 60°, inclusive.
16. A gas/liquid separator assembly according to claim 15 wherein:
  - (a) said downcomer channel has a width of extension, between the outer wall and the axial shroud, of at least 90% of an extension of the inlet skirt between the outer wall and the axial shroud.
17. A gas/liquid separator assembly according to claim 16 wherein:
  - (a) said downcomer channel has a width of extension, between the outer wall and the axial shroud, of at least 95% of an extension of the inlet skirt between the outer wall and the axial shroud.

18. A preseparation arrangement for use in a gas/liquid separator assembly according to any one of claims 1-17; the preseparation arrangement comprising:
- (a) a radially continuous axial shroud;
  - (b) an inlet skirt having at least one downcomer channel therein;
    - (i) the inlet skirt having a declination angle of at least 20°.
  - (c) a radial vane positioned to direct gas flow around the axial shroud a radial distance of at least 180°, before encountering the downcomer channel.
19. An inlet skirt arrangement for use in a gas/liquid separator assembly according to any one of claims 1-17; the inlet skirt comprising:
- (a) a circular skirt arrangement having an upper surface with a declination angle of at least 20° from an inside edge to an outside edge, and at least one downcomer channel therein; and
  - (b) a radial vane projecting from the upper surface of the circular skirt in a direction opposite the declination;
    - (i) the downcomer channel being a gap in the skirt positioned at least 180° radially, from the vane.
20. A method of separating an air/oil mixture from compressor; said method including steps of:
- (a) providing a gas/liquid separator according to any one of claims 1-17 with at least one removable and replaceable separator element therein, and;
  - (b) directing a fluid stream from the inlet:
    - (i) around the axial shroud a distance of at least 70°;
    - (ii) downward;
    - (iii) beneath a lower edge of an axial shroud;
    - (iv) through at least one removable and replaceable separator element; and
    - (v) outwardly through an outlet.